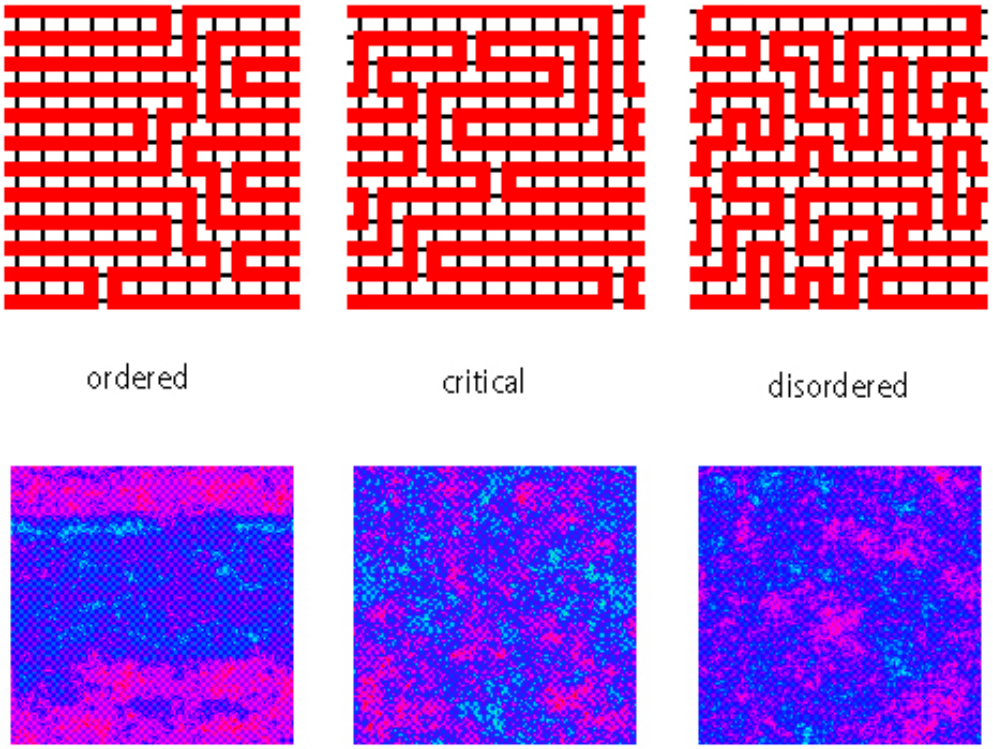
# Statistical Physics of Compact Polymers

Jane' Kondev, Brandeis University, CAREER DMR-9984471

Polymers in biology are often found in the compact state; globular proteins and DNA packed in bacterial viruses are two examples. The competition between the bending energy and entropy of a compact polymer leads to a melting transition between an ordered and a disordered state.

P.J. Flory introduced in 1956 a simple lattice model of polymer melting. We have constructed an exact field theory of the Flory model in two-dimensions by mapping it to an interface model which undergoes a roughening transition. This mapping resolves a decades old controversy and proves that polymer melting in two-dimensions is **continuous**.




Phases of the Flory model and their interface counterparts. The disordered phase corresponds to a rough interface, while the ordered phase maps to a flat one.

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## Student involvement:

Allison Ferguson (grad)

Richard Oberdorf (undergrad)

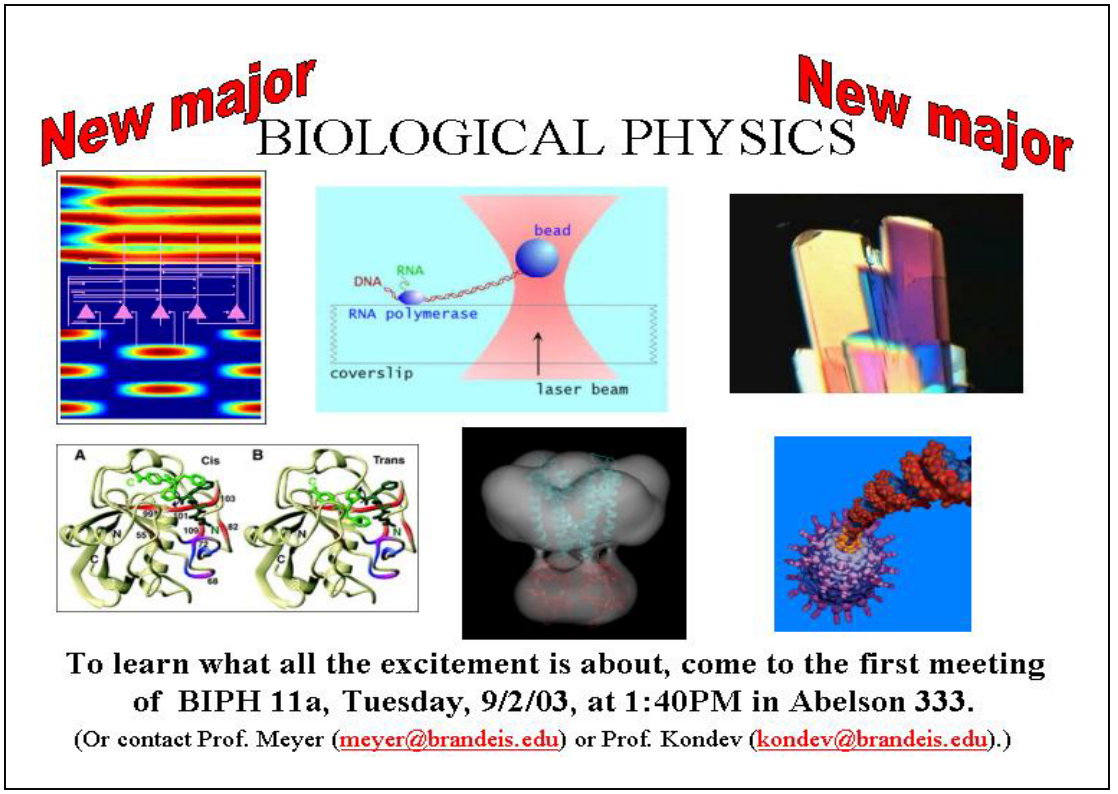
## International collaboration:

Jesper Jacobsen (Orsay)

## Physics and Biology:

Rob Phillips (Caltech) and I are writing a book, for Garland Publishing, on the role of simples models and estimates in Biology.

Bob Meyer and I have launched a new major in Biological Physics at Brandeis, and are co-teaching a freshman seminar on the subject.




Poster announcing the new Biological Physics major at Brandeis University.
http://www.brandeis.edu/programs/biophysics/